

# Operating Instructions

## OS GT 55



**Be sure to read right through the operating instructions before you attempt to run the engine for the first time.**

The OS GT 55 has been developed and built for propeller-driven radio-controlled model aircraft. It will satisfy all your expectations of an internal-combustion engine.

### **Specification**

Capacity	<b>54.93 cc</b>	Speed range	<b>1500 - 8000 rpm</b>
Bore	<b>41.2 mm</b>	Maximum power **	<b>5.5 BHP / 7000 rpm</b>
Stroke	<b>41.2 mm</b>	Maximum torque **	
Total weight of engine, excluding ignition unit *	<b>1590 g</b>	Fuel	<b>Unleaded petrol, 95 octane</b>
Weight of ignition unit	<b>140 g</b>	Lubrication	<b>Oil - petrol mix, ratio 1 : 40</b>

Some manufacturers state the weight of their engines excluding essential accessories. The value stated in the table refers to the completely assembled engine, including sparkplug, carburettor, propeller driver and propeller retaining screws.

The unit's power output may vary according to the silencer used. The stated value indicates the maximum attainable power.

### **Safety Notes:**

- 1) It is prohibited to use the engine as power plant for a manned aircraft.
- 2) Local safety regulations must always be observed when operating any model aircraft.
- 3) The manufacturer accepts no liability of any kind for damage or injury caused by the operation of models or other apparatus powered by the OS GT 55 engine.
- 4) It is essential to use genuine replacement parts exclusively.
- 5) Do not operate the engine unless you are confident of the correct procedure.
- 6) Before every flight please check that the propeller retaining screws are intact and properly tightened. If you are using a spinner, check that this is also securely fixed. Refer to the instructions supplied with the spinner when installing the unit.
- 7) At regular intervals check that the engine is still securely attached to its mountings. If the engine is loose, do not attempt to start it!
- 8) Always use propellers which have already been accurately balanced. Never re-use a damaged propeller!
- 9) Ensure that no part of your body lies within the rotational plane of the propeller.
- 10) When starting and running the engine, always wear close-fitting clothing, properly secured. Avoid loose garments such as ties, scarves, etc.
- 11) Never attempt to stop the engine with any part of your body.

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- 12) The engine should always be stopped by turning off the power supply to the ignition system.
- 13) Ensure that the engine is securely mounted before starting it.
- 14) Petrol is an inflammable fluid, and must therefore be stored in a sealed container. Keep petrol a safe distance from the engine when it is running.
- 15) Always observe the instructions provided by the manufacturer or dealer when handling petrol-based fuels.
- 16) Keep small objects a safe distance away from the engine when it is running. Never throw any object into the spinning propeller.
- 17) Please select a suitable location for starting your engine; avoid dusty or sandy environments in particular.
- 18) The engine should only be run in the open air. Do not operate it indoors.
- 19) Ensure that spectators - especially children - are kept a safe distance away from the engine when it is running, i.e. at least 10 m away.
- 20) The power of the engine makes it suitable for use in large-scale model aircraft. Operating large model aircraft incompetently or carelessly can easily result in serious damage or injury. Do not run the OS GT 55 petrol engine in a model until and unless you have flown smaller models successfully.

### **Selecting suitable propellers**

Although propellers made by different manufacturers may be of the same nominal size, they are generally not identical. In fact, it is often the case that propellers of the same size from one and the same manufacturer differ slightly. Engine output can only be exploited to the full when the curves for propeller dynamics and engine power (rpm / power) coincide in the area of maximum engine output. Unfortunately this information is not provided by the propeller manufacturers. Engine output also varies widely according to other factors: in particular the silencer. The situation is further complicated by ambient conditions such as temperature and air pressure: propeller power can be 20% greater at low temperature and high air pressure than at high temperature.

The OS GT 55 achieves its maximum output at 7500 - 8000 rpm, although this does depend on the silencer you are using. If you wish to make full use of its potential power, select a propeller which the engine turns at this speed - or slightly lower - on the ground, bearing in mind the model's airspeed. We do not recommend using any propeller which causes the engine to turn at more than 7500 rpm on the ground.

Recommended  
propeller sizes:

Two-bladed:  
22 x 8" - 24 x 10"

These values are only approximate, and may vary according to the factors described above as well as the type of silencer fitted to the engine.

Note: if the propeller hub is less than 21 mm thick (see illustration), you will need to shorten the socket-head cap screws to suit. At the other extreme, the propeller hub and washer must not be more than 36 mm thick if you wish to use the standard propeller retaining screws.

## Fuel

For normal running always use unleaded petrol (95 octane) mixed with Mobil Racing 2T oil at a ratio of 40 parts petrol to one part oil. If necessary, it is also permissible to use **high-quality synthetic oil for two-stroke engines**.

Please use the Racing 2T oil supplied in the set for running-in the engine. The ratio should be 30 : 1 at this stage.

Never use cheap oil which is intended for garden power tools, or synthetic oils which are designed for methanol-fuelled model engines. The manufacturer accepts no liability of any kind for engine damage caused by the use of cheap or unsuitable lubricants.

***Please note: the internal diameter of the petrol tubing should be at least 4 mm!***

## Installation

The engine is designed to be mounted by means of the four lugs which are an integral part of the rear crankcase cover. The power plant should be screwed directly to the model's firewall using M5 machine screws. If you prefer to install the engine using flexible mountings, ensure that the system is strong enough, i.e. that the components are designed for engines of this size. Use thread-lock fluid or similar on all mounting screws to prevent them working loose, and check at regular intervals that they are undamaged and firmly secured.

Since the engine is air-cooled, it is essential to provide an adequate flow of air through the engine cowl. The hot air outlet is very important: it must be larger than the air intake opening. Petrol engines heat up to a much greater extent than engines which run on methanol!

Please bear in mind that the engine requires the oxygen in the air in order to run, so there must be an adequate flow of air to the carburettor. Caution: feeding warm air to the carburettor from inside the cowl will have a marked adverse effect on the engine's performance.

### ***Caution!***

***When installing the engine in a model please seal off all openings in order to prevent sanding dust or other harmful particles entering it.***

## Silencers

Use only ready-made silencers suitable for this engine type, otherwise it is unlikely that the unit will achieve the specified output power.

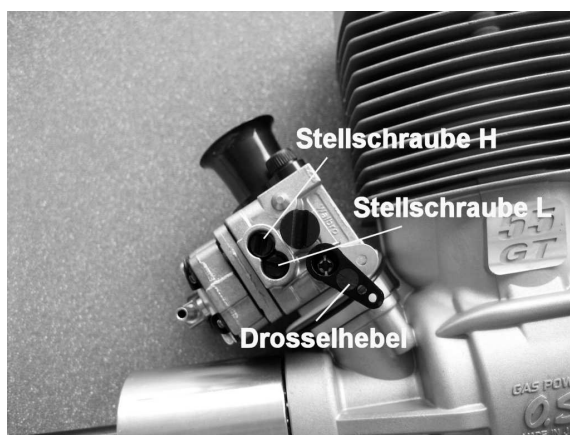
The manufacturer accepts no liability of any kind for engine damage caused by the use of unsuitable silencer systems.

Please refer to the manufacturer's instructions when installing the silencer. Ensure that the silencer is adequately cooled.

## Basic carburettor set-up:

**Base settings:** low-speed needle ( L ) for low engine speeds: 1.75 turns open (1 turn, 45 min. of arc)

High-speed needle ( H ) for high engine speeds: 1.15 turns open (1 turn, 10 min. of arc)



The engine is supplied with the carburettor needles set to these values. Do not change these settings during the running-in period!

Once the engine is fully run-in, the settings can be adjusted as follows:

- Start the engine and allow it to warm up
- Leave the engine at idle for about five seconds

**If the engine starts in reverse, do not open the throttle flap! Stop the engine at once, otherwise it could be damaged.**

### Step I

- Open the throttle flap to the 2/3 point fairly quickly (within about one second - rapid acceleration). Repeat this procedure three times: if the engine picks up speed briskly, without "coughing", skip to Step III. If it fails to accelerate smoothly, continue with Step II.

### Step II

- In most cases a failure to pick up speed smoothly (the engine coughs and hesitates) is due to insufficient fuel supply in the middle of the speed range.

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Stop the engine and check the fuel supply (the fuel tubing must not be kinked or damaged; check also that the fuel filter is allowing fuel through). Start the engine again and check its acceleration once more. If the problem persists, adjust the carburettor by opening the low-speed needle L by about one eighth of a turn, then check the speed pick-up again. When the engine accelerates smoothly, open the same needle by a further eighth of a turn, because the default setting is close to the limit; unless you do this, the problem could return if weather conditions alter during a flight.

If the engine continues to be reluctant to pick up speed, open the low-speed needle L by a further one eighth turn. If the engine's running characteristics are still no better, return the carburettor to its default settings, re-start the engine and check the speed pick-up. If it accelerates smoothly, move on to Step III. If the engine is still reluctant to pick up speed, open the needle by a further eighth of a turn. If even this does not cure the problem, the fault is unlikely to lie in the carburettor settings; in this case please refer to the "Fault-finding" section.

### Step III

- When the engine picks up speed correctly, as described above, allow it to accelerate from idle to full-throttle. Repeat this procedure two more times. If the engine picks up speed smoothly, move on to Step IV. If acceleration is not smooth, open up the idle needle L by a further eighth of a full turn.

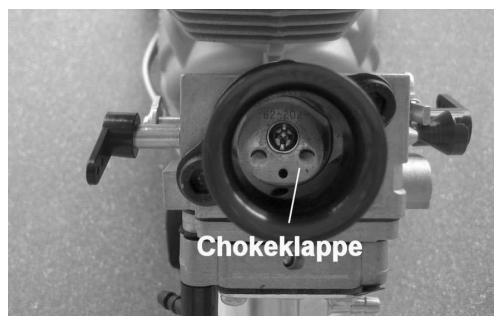
If the engine does not respond quickly enough when the throttle is opened, close the L-needle again just to the point where the engine hesitates when the throttle is advanced. Starting from this point, open the idle needle L by a further eighth of a turn.

### Step IV

- The engine should now be functioning correctly; the last step is to apply full-throttle: if the engine does not slow down, you have completed the set-up procedure successfully. If the full-throttle speed declines (sags) slightly, open the high-speed needle H by one eighth of a turn.

**Caution !!! It is essential to stop the engine every time you need to adjust the carburettor, to avoid the risk of injury from the propeller.**

**Caution !!! Never close the choke completely when the engine is running.**



Remove the idle adjustment screw from the carburettor.

Please leave the return spring attached to the throttle flap, as its purpose is to remove any play in the throttle linkage.

### **Starting and running-in a new engine:**

Before starting the engine it is important to check that the sparkplug is in place and tight, and that the plug cap is firmly seated.

Mount the ignition sensor over the magnet at a suitable position using the screws supplied in the set.

***Never turn the engine over with the ignition system switched on when no spark-plug is fitted, as this could cause damage to the ignition unit.***

1) The ignition should be switched off, the choke and the throttle flap half-open. If fuel is not yet present at the carburettor, turn the propeller over three or four times. If fuel is already present, turn it over only once or twice.

2) Switch the ignition on, open the choke, set the throttle flap to a slightly elevated idle, then flip the propeller over briskly several times. If you do not hear the engine fire after the fourth flip with the choke closed, turn the propeller over twice more as described under 1), then resume at section 2) of the instructions.

3) If the engine fails to start after several strong flips, open the throttle flap fully and turn the engine over about four times. Switch the ignition off, then on again; close the throttle flap slightly, open the choke, and attempt once more to start the engine.

4) If the engine still refuses to start, unscrew the sparkplug and check the electrodes: dry off any petrol residues (this indicates excessive fuel in the engine), then screw the sparkplug in again. Further attempts at starting should now be carried out with the throttle flap closed. However, if the sparkplug is dry, this normally means that too little fuel is reaching the carburettor. In this case please check the fuel supply system before resuming the starting procedure as described under section 1.

**If the engine starts in reverse, do not open the throttle flap! Stop the engine at once, otherwise it could be damaged.**

Once the engine has started, allow it to run at a slightly high idle for about two minutes. When it is warm, run the engine in for about twenty minutes, increasing the speed from idle to half-throttle, then three-quarters-throttle; initially leave the engine at each setting only briefly, but increase the period steadily as running time accumulates. After ten minutes of running it is safe to open the throttle flap fully for brief periods. Stop the engine after the first run, and leave it to cool down. Start the engine again and check the carburettor settings. If everything is in order, you can fly the engine for the first time: during the first few flights take care not to overload the engine, and avoid extended periods of high-speed flying; this is particularly important in hot weather. Once you have used up all the fuel mixture containing the oil supplied in the set (1 : 30 mix), switch to a 1 : 40 fuel blend for further flying.

**NEVER RUN-IN THE ENGINE BY LEAVING IT AT THE IDLE SETTING !**

## Fault-finding

### Engine fails to start:

- Check the sparkplug, and replace it if necessary (screw the sparkplug in, tighten it, then push the plug cap on top)
- Check that fuel is reaching the carburettor
- Turn the engine over to check its mechanical condition
- Are the carburettor needles set correctly?
- Remove the carburettor and examine the carbon fibre reed valve
- Unscrew the carburettor cover on the pressure inlet side, check the petrol filter, and blow out the carburettor with compressed air; take care when re-assembling the carburettor to position the membrane and seal correctly
- Check the pressure tube at the carburettor once more

### Replacing the reed valve:

- Unscrew the carburettor (watch out for the gasket)
- Loosen the four M4 screws in the flange, remove the flange, and lift out the reed valve (don't lose the gasket)
- Undo the four M2 screws, remove the old valves, and replace them with new ones. Re-fit the screws and tighten them lightly
- Take care to position the gasket correctly when re-installing the carburettor

### Mechanical engine fault:

- Engine cannot be turned over:
  - Possible cause – seized piston: loosen the M4 cylinder head screws
  - Carefully remove the cylinder head
  - Close examination of the piston and crankcase might reveal the cause of the mechanical problem.
  - **Mechanical repairs must always be carried out by an approved Service Centre**

## Maintenance Information:

After three hours of running (or fifteen flights) the front crankshaft bearings should be lubricated. When the engine is new, this should be carried out after ten hours of running.

Replace the sparkplug after twenty hours of running; check the reed valve membranes at the same time.

After about forty hours of running replace the reed valve membranes; check the connecting rod, piston ring, piston and ballraces at the same time.

If repairs are required, please contact our Service Department.

After 200 hours of running send the engine to our Service Department for checking.



## **Guarantee**

The manufacturer grants a two-year guarantee which covers material defects and production faults. The guarantee is limited to the original purchaser only. If the engine is sold, the guarantee cannot be transferred to the new owner.

### **The following are not covered by the guarantee:**

- Normal wear and tear
- Damage resulting from crashes or accidents
- Damage resulting from the use of non-balanced or damaged propellers
- Damage resulting from the use of too large or too small a propeller
- Damage resulting from the use of poor-quality petrol
- Damage resulting from the use of non-original replacement parts and accessories
- Damage resulting from unauthorised intervention in the engine
- Damage resulting from incorrect or incompetent handling of the engine.

And now all that remains is to wish you many hours of pleasure and fun flying your **OS GT 55**.

Yours: the ***Graupner*** team !